



www.alltraxinc.com

# Operators Manual SR



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# WARNINGS

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## Safety Notes:

When working on electric vehicles, sudden unexpected events can occur, it's recommended to:

- Place the drive axle on jack stands—wheels off the floor.
- When working on wiring or batteries, always remove rings and watches.
- Use the proper safety equipment, eye protection, and insulated tools.
- Never connect a computer while the vehicle is being charged.
- Disconnect batteries before installing or working on the controller.
- Wear safety glasses.
- Because hydrogen can build up due to gassing from the batteries, work in a well ventilated area.
- Make sure the battery pack is fused.
- Do not clean the controller with a high PSI pressure washer.
- When cleaning batteries, take precautions to keep the battery acid from splashing on the controller.

Note:

It is the installer's responsibility to ensure the correct equipment (ie. wire, motor, solenoid, fuse etc) is installed in the car.

## READ AND SAVE THESE INSTRUCTIONS

# USABILITY STATEMENT

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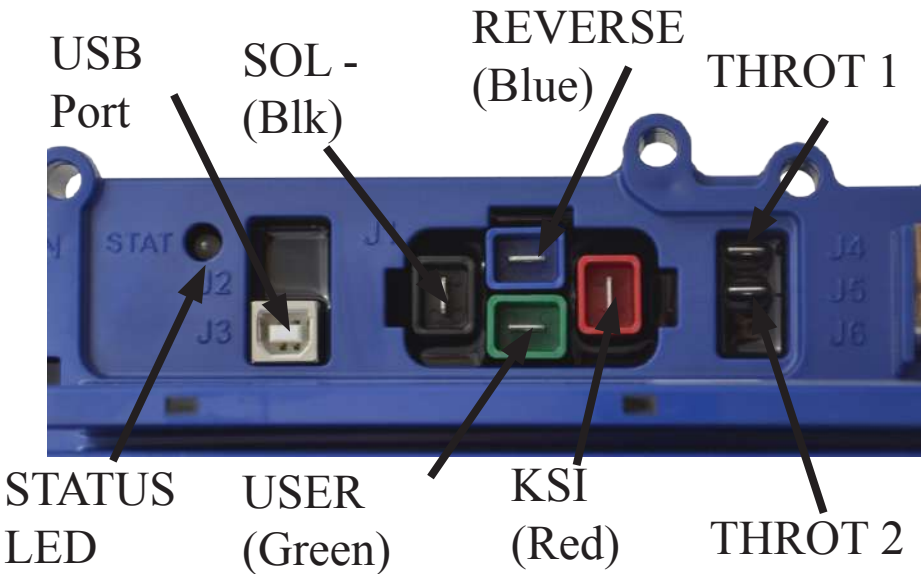
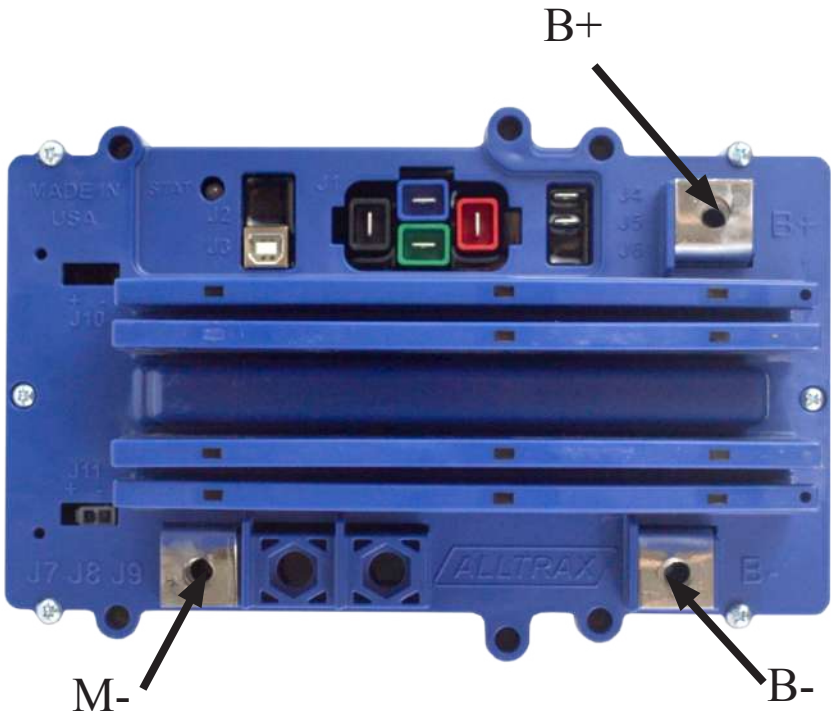


Alltrax Inc's lines of Series and Shunt Motor Controllers are intended for use with motors only. Any application or usage that does not meet these criteria WILL NOT be covered by warranty. Also, any requests for design assistance or technical support outside the scope of the product intended use may be denied. Alltrax assumes no liability for any damage or injury as a result of use of the motor controllers in a non-traction or process motor application.

**WARNING:** Use of this product for other than these specified uses may be highly dangerous and lead to serious injuries or death.

**WARNING:** The use of this product for the production of Plasma Assisted Hydrogen, Brown's Gas, HHO (H<sub>2</sub>O Hydrogen Electrolysis) or any other type of gas is prohibited. Generation and storage of these gasses is extremely dangerous and poses a significant risk of explosion, fire, property damage and serious injury or death.

# SR LAYOUT



# SR SPECIFICATIONS

Model	Peak (Amps)	2 Min (Amps)	5 Min (Amps)	Continuous (Amps)
SR48300	300/350 <sup>1</sup>	300 (1.5min)	230	210
SR48400	400/460 <sup>1</sup>	400	320	300
SR48500	500/575 <sup>1</sup>	500	420	380
SR48600	600/690 <sup>1</sup>	600	500	450
SR72300	300/350 <sup>1</sup>	300	250	220
SR72400	400/460 <sup>1</sup>	400 (1.5min)	300	270
SR72500	500/575 <sup>1</sup>	500	420	380

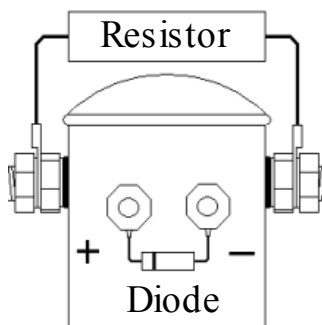
Note<sup>1</sup>: The larger number represents the value when the "Peak Amp Mode" is enabled in the Alltrax Toolkit program.

All ratings are at 25°C with nominal rated voltages at 50% PWM. Actual currents are ±5% listed rating

<b>Type:</b>	Series Motor Controller
<b>Operating Frequency:</b>	18kHz
<b>Controller Voltage, KSI &amp; Reverse:</b>	SR48XXX 12-48V nom, 62V max SR72XXX 12-72V nom, 90V max
<b>Controller Operating Temp:</b>	-20°C to 75°C, shutdown @ 85°C
<b>Environmental Operating Temp:</b>	-20°C to 50°C
<b>Stand by Power (Power up):</b>	<1W nom, <8W Fan on
<b>Stand by Current:</b>	<20mA
<b>Relay Drive Current:</b>	5A peak, 1A Cont.
<b>KSI Peak In Rush:</b>	60V = 9A, 30V = 4A, 9.5V = 2A
<b>Throttles Supported:</b>	0-5k, 5k-0, E-Z-GO ITS, Club Cart 5k-0 3 Wire (MCOR), 0-5v, Taylor Dunn 6v-10.5v, USB Throttle, Absolute Mode
<b>Terminal Torque:</b>	Torque to 60-80 in.lb (5-7 ft/lb, 6.77-9.4Nm)
<b>Mounting Bolt Torque:</b>	Torque bolts to 15-20 in.lb (1.25-1.75 ft.lb, 1.7-2.25nm)

# INSTALLATION

## Resistor & Diode Mounting



The diode across the coil terminals safely dissipates the energy when the coil is turned off. Installation Dependant, refer to applicable drawing.



Contactor Size	Diode	Diode Current
70A-200A Solenoid	1N4004	1A
400A-550A Solenoid	1N5408	3A
600A or larger Solenoid	MR754	6A

The resistor typically seen across the contactors big terminals pre-charges the filter capacitors in the controller. This minimizes arcing across the contactor terminals when closing.

Battery Voltage	Resistor
12-36V	220-250 Ohm 10W
48V	470 Ohm 10W
72V	1000 Ohm 10W





## F/R Switch

The forward/reverse switch is an often overlooked part of the upgrade process. In a series motor, all of the motor current will pass through the F/R switch. An undersized F/R Switch is as bad as an undersized solenoid or small wire gauge.

For higher amperage controllers (>600A), it is suggested that a change-over contactor set up be used. These are large enough to handle the higher currents without over heating the contacts and they provide the user the ability to change direction by flipping a switch.

<b>Controller Amperage</b>	<b>F/R Size</b>
400A or less	Stock/HD
450A to 650A	Heavy Duty/Change-Over Contactor
650A or more	Change-Over Contactor



Change-over contactors are multiple contactors bound together that allow the user to change the polarity of the voltage going to the motor thus reversing direction. It works exactly the same as the manual F/R switch, except that it uses coil drive contactors. See the installation drawings for how to wire a change-over contactor.

## ***Contactors (Solenoids)***

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The solenoid is the primary disconnect of the battery pack in the case of the an emergency. In order to be effective, the solenoid needs to be properly rated for the current that will be drawn from the batteries. It is VERY important that the solenoid be rated correctly. It is the only way to disconnect the batteries from the motor/controller loop in case of a failure. Too small of a solenoid increases the likelihood that the contacts will weld together and not be able open.

### **UNACCEPTABLE**



#### **Stock 70 AMP**

Used with older ClubCars vehicles

**DO NOT Use with  
Alltrax Controller**

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### **STANDARD DUTY**

Flat lands with moderate speed and torque performance expectations.



#### **Stock 100 AMP**

Use with 300A controllers.

## HEAVY DUTY

High performance, high speed, maximum torque, pulling loads, hilly terrain or Hunting Buggies.



**Performance 200 AMP**  
(600amp Inrush) Use with 300  
and 400 AMP Controllers



**Heavy Duty 200 AMP**  
(800A surge) Use with 300 to  
500 AMP Controllers



**Heavy Duty 400 AMP**  
(1000A surge) Use with 500 and  
600 AMP Controllers  
Suggested types:  
SW200  
MZJ400 (Shown)

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## EXTREME DUTY



**Extreme Duty 600A+ AMP**  
(1000A + surge) Use with 600  
AMP or bigger Controllers.

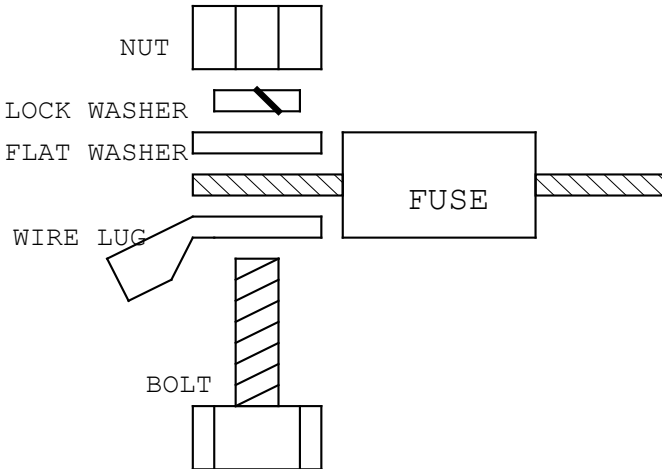
# Fuse

Any application where there is a battery pack, a fuse must be installed. A fuse will open the battery circuit and prevent any serious damage from occurring.

The fuse should be installed on or between the battery terminals. The main B+, B- or in-between 2 batteries is an acceptable location. The fuse must be rated for pack voltage and fault current.



Controller Amperage	Fuse Rating
400A or less	250A
450A to 650A	400A
650A or more	600A



**Diagram: Fuse terminal hardware**

## **Wiring**

Wiring and battery health in an electric vehicle are very important and overlooked during performance upgrades. Wiring size is important for safety and proper operation of the vehicle. Undersized wires will affect the performance of controllers and can overheat. Wires should be crimped with proper sized terminals and tools to provide a clean low resistance connection.

Controller	Min. Wire AWG Standard Duty	Min. Wire AWG Heavy Duty
300A	OEM -6 AWG	4 AWG
400A	4 AWG	4 AWG
500A	2 AWG	1/0 AWG
600A	1/0 AWG	2/0 AWG

### **Power Wiring**

When running wiring for the vehicle care must be taken for proper wire routing. Power wiring should be of proper sizing and ran as low in the framework of the vehicle as practical. Lengths of power wire runs need to be kept short and pairs of wires from common circuits should be grouped together to reduce EMC emissions. Secure all power wiring to the vehicle framework.

### **Signal Wiring**

Signal wires should be keep as short as practical. Care should be taken to protect the wires sharp edges and rubbing. Consider the use of split loom or braided wire sheathing. Fasten bundles securely to framework. Do not route the signal wires together in the same bundle with power wires. All safety interlocks (KSI, Footswitch, etc) need to be mechanical switches or electromechanical relay.

# **INSTALLATION DRAWINGS**

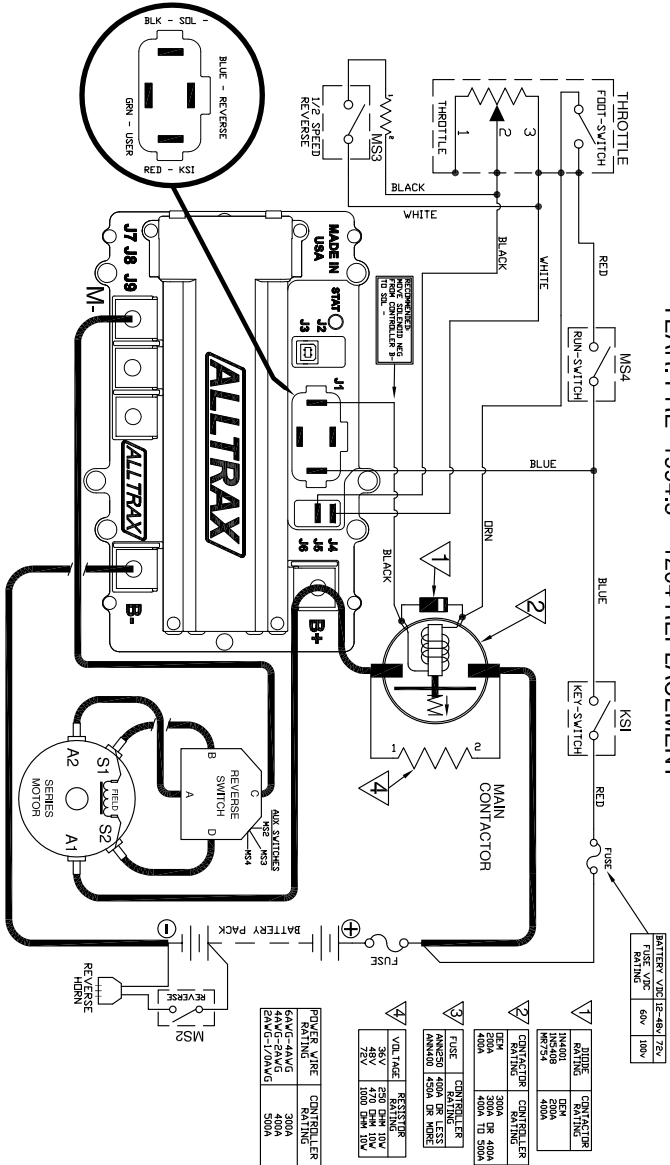
See our Website more drawings:  
Full Sized & Updated  
Other OEM Drawings  
More Generic Wire Diagrams  
Non Standard Throttle Wiring

# PRE-1994 EZGO

## SR to E-Z-GO TXT

YEAR: PRE-1994.5 -- 1204 REPLACEMENT

PART NO. DOC110-040



### NOTES:

- ◆ FUSES REQUIRED FOR ALL INSTALLATIONS
- ◆ FUSES MUST BE OF THE CORRECT RATING
- ◆ KSI IS REQUIRED TO BE A SWITCHED INPUT, NOT RESISTIVE
- > ASSUMES FOOTSWITCH IS OPEN WHEN THROTTLE OPERATION WITHOUT NOTICE
- > WITHOUT NOTICE
- > ALTRAX MAKES NO WARRANTY AS TO THE ACCURACY, COMPLETENESS, OR VALIDITY OF THE INFORMATION OR OTHER INFORMATION PROVIDED
- > SEE OPERATOR'S MANUAL FOR MORE INFORMATION

DO NOT SCALE DRAWING

ALTRAX 1111 Chenoa Creek Rd.

Medford, NJ 07645-4900

SR to EZGO Pre-1994 Meddolist

Wiring Diagram

SIZE DOCUMENT NO. DOC110-040

REV. B

SHEET 1 of 1

REV.	ECO.	DATE	APVD	DWG SCALE	NS
A	033016	033016	RC		033116
B	032617	032617	RC		

DESIGNED BY: DCS/RC  
 DRAWN BY: DCS/RC  
 CHECKED BY: DCS/RC  
 DATE: 03/16/94  
 TITLE: SR to EZGO Pre-1994 Meddolist  
 WIRING DIAGRAM

The Stock-Altura-A

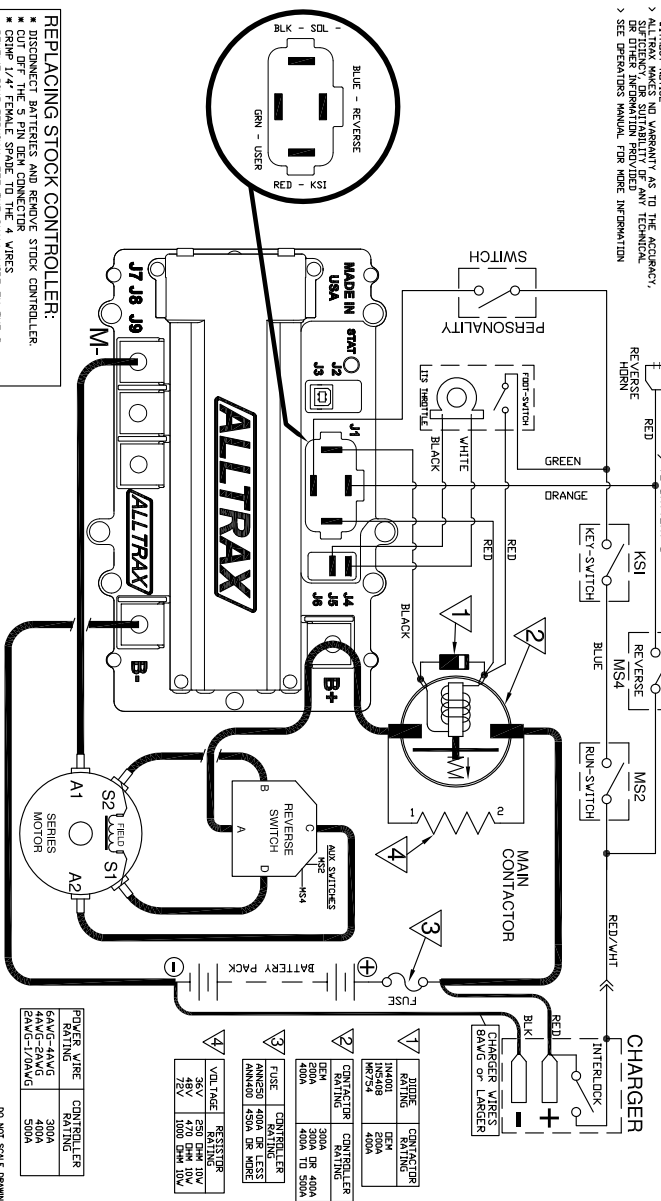
# 1994 AND NEWER EZGO

## NOTES:

- \* FUSES REQUIRED FOR ALL INSTALLATIONS
- \* BONDING REQUIRED AGAINST COILS / RELAYS
- \* KSI IS REQUIRED TO BE A SWITCHED INPUT, NOT RESISTIVE
- > ALTRAX RESERVES THE RIGHT TO CHANGE IDENTIFICATION WITHOUT NOTICE AND VARIABILITY AS TO THE TECHNICAL SUPPORT, OR SUITABILITY OF ANY TERMINAL OR OTHER INFORMATION PROVIDED
- > SEE OPERATORS MANUAL FOR MORE INFORMATION

## SR to E-Z-GO TXT

### YEAR: 1994.5 TO PRESENT -- 1206 REPLACEMENT



### REPLACING STOCK CONTROLLER:

- \* DISCONNECT BATTERIES AND REMOVE STOCK CONTROLLER.
- \* CUT OFF THE 5 PIN DEN CONNECTOR
- \* GRIP 1/4" FEMALE SPADE TO THE 4 WIRES
- \* REMOVE THE 5 PIN DEN CONNECTOR ON THE B-
- \* GRIP 1/4" FEMALE SPADE TO THE 4 WIRES
- \* CONNECT DEN RED WIRE TO THE RED TERMINAL ON CONTROLLER
- \* CONNECT DEN ORANGE WIRE TO J4 ON CONTROLLER
- \* CONNECT DEN BLACK WIRE TO J5 ON CONTROLLER
- \* CONNECT DEN WHITE WIRE FROM STEREO TO BLACK TERMINAL
- \* CONNECT LABEL WIRES TO CONTROLLER AS FOLLOWS

POWER WIRE RATING	CONTROLLER RATING
6AWG-4AWG	300A
4AWG-2AWG	400A
2AWG-1AWG	500A

BONDING RATING	CONTRACTOR RATING
10000	4000
4000	2000
2000	1000

CONTRACTOR RATING	CONTROLLER RATING
300A	400A
200A	300A
100A	200A

FUSE RATING	CONTROLLER RATING
400A	400A
250A	300A
150A	200A

VOLTAGE RATING	RESISTANCE RATING
36V	250 OHM 10W
24V	150 OHM 10W
12V	1000 OHM 10W

REV.	ECO.	DATE	BY	CHK.	DESCRIPTION
B	030117	030117	KC		

REV.	ECO.	DATE	BY	CHK.	DESCRIPTION
A	030117	030117	KC		

**ALTRAX** 1111 Grand Canal Rd  
 Orange Park, FL 32067  
 Phone: (407) 478-3568

SR to EZGO 1994 to Present TXT  
 WIRING DIAGRAM  
 DOC110-036  
 SHEET 1 of 1

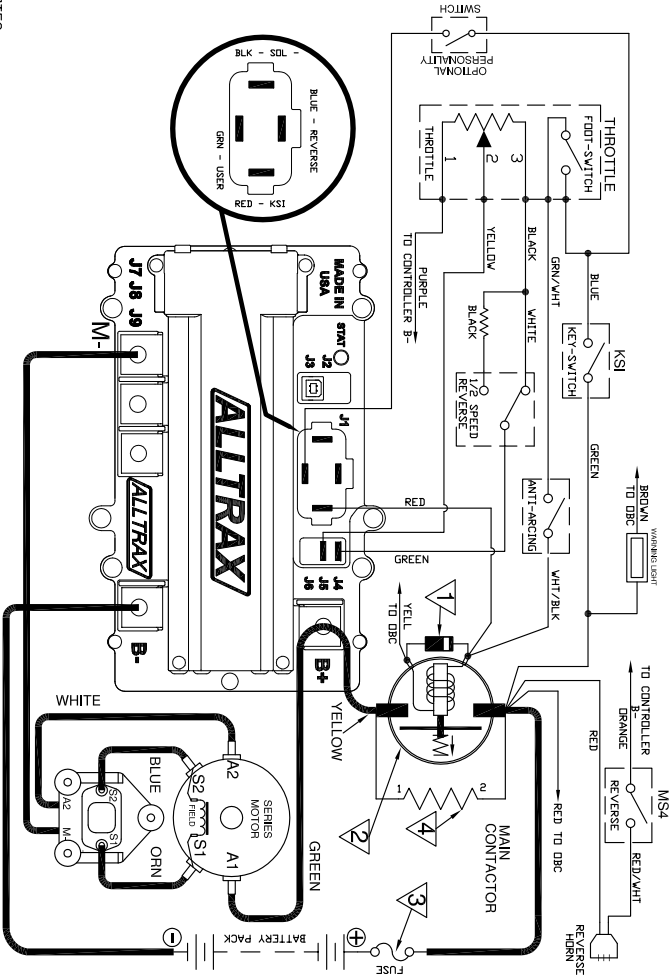
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# 1994 AND NEWER CLUB CAR

## SR to CLUB CAR DS YEAR: 1995 TO PRESENT

PART NO. DOC110-037



- NOTES:
- > FUSES REQUIRED FOR ALL INSTALLATIONS
  - > ALL WIRING MUST BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE
  - > KSI IS REQUIRED TO BE A SWITCHED INPUT, NOT RESISTIVE
  - > ASSUMES FOOTSWITCH IS OPEN WHEN THROTTLE UPF
  - > W/THOUT NOTICE THE RIGHT TO CHANGE REPRESENTATION
  - > ALLTRAX MAKES NO WARRANTY AS TO THE ACCURACY, COMPLETENESS OR FITNESS FOR ANY PARTICULAR USE OR OTHER INFORMATION PROVIDED
  - > SEE OPERATOR'S MANUAL FOR MORE INFORMATION

1	RESISTOR	300A	10V
2	CONTRACTOR	300A	10V
3	CONTRACTOR	400A	10V
4	CONTRACTOR	400A	10V
5	CONTRACTOR	400A	10V
6	CONTRACTOR	400A	10V
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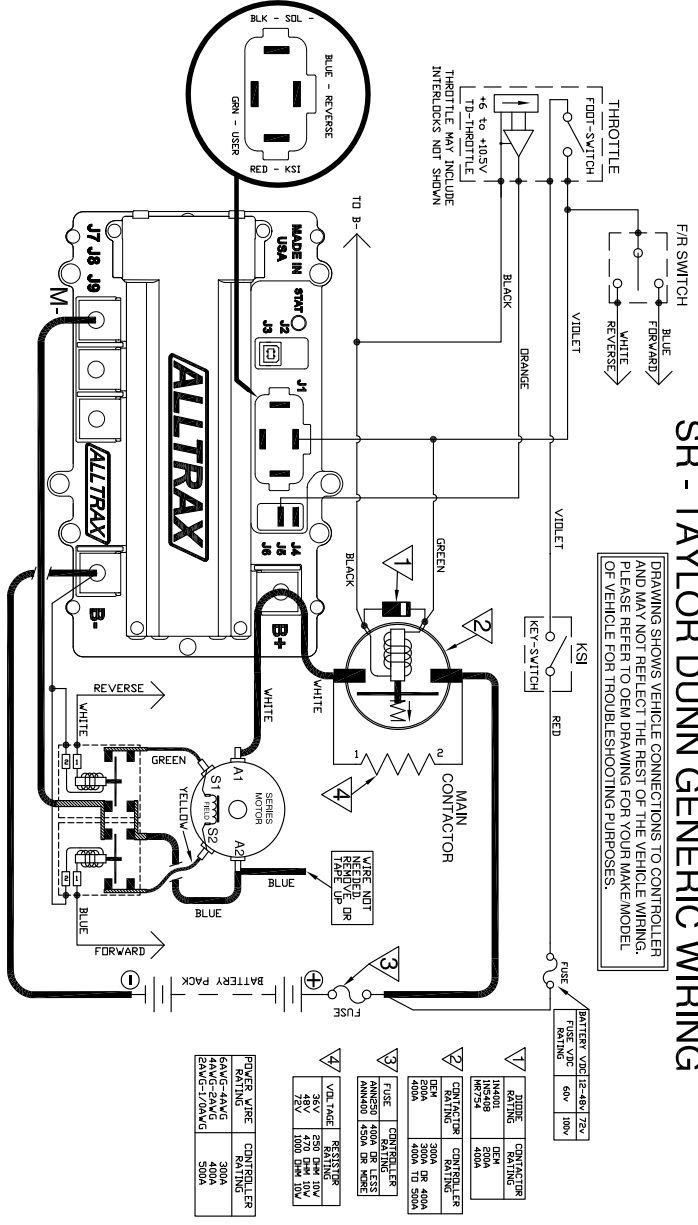
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TITLE		SR to Club Car DS	
Wiring Diagram		SIZE DOCUMENT NO.	
A		DOC110-037	
REV.		B	
SHEET		1 of 1	



# TAYLOR DUNN GENERIC WIRING

## SR - TAYLOR DUNN GENERIC WIRING

DRAWING SHOWS VEHICLE CONNECTIONS TO CONTROLLER AND MAY NOT REFLECT THE REST OF THE VEHICLE WIRING. PLEASE REFER TO OEM DRAWING FOR YOUR MAKE/MODEL OF VEHICLE FOR TROUBLESHOOTING PURPOSES.



**NOTES:**

- > FUSES REQUIRED FOR ALL INSTALLATIONS
- > WIRING MUST BE DONE BY A QUALIFIED TECHNICIAN
- > BATTERY PACK MUST BE PROPERLY SECURED AND NOT RESTRICTIVE
- > ASSUMES FOOTSWITCH IS OPEN WHEN THROTTLE OFF
- > ALLTRAX RESERVES THE RIGHT TO CHANGE DOCUMENTATION
- > ALLTRAX MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY, OR SUITABILITY OF ANY TECHNICAL INFORMATION OR DRAWING.
- > SEE OPERATORS MANUAL FOR MORE INFORMATION

BATTERY VOLTAGE RATING	12-48V / 24V
FUSE VOLTAGE RATING	60V / 100V

DIODE CONTACTOR RATING	100A / 60V / 400A
INDUCTION MOTOR RATING	100A / 60V / 400A
RELAY RATING	100A / 60V / 400A

CONTACTOR CONTROLLER RATING	500A / 300V / 400A / 400A / 500A
CONTACTOR CONTROLLER RATING	500A / 300V / 400A / 400A / 500A

FUSE RATING	100A / 60V / 400A / 400A / 500A
CONTACTOR RATING	100A / 60V / 400A / 400A / 500A
CONTACTOR RATING	100A / 60V / 400A / 400A / 500A

VOLTAGE RESISTANCE	3.6V / 250 OHM / 10V / 25V / 1000 OHM / 10V
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POWER WIRE RATING	300A / 500A / 500A
CONTROL WIRE RATING	300A / 500A / 500A

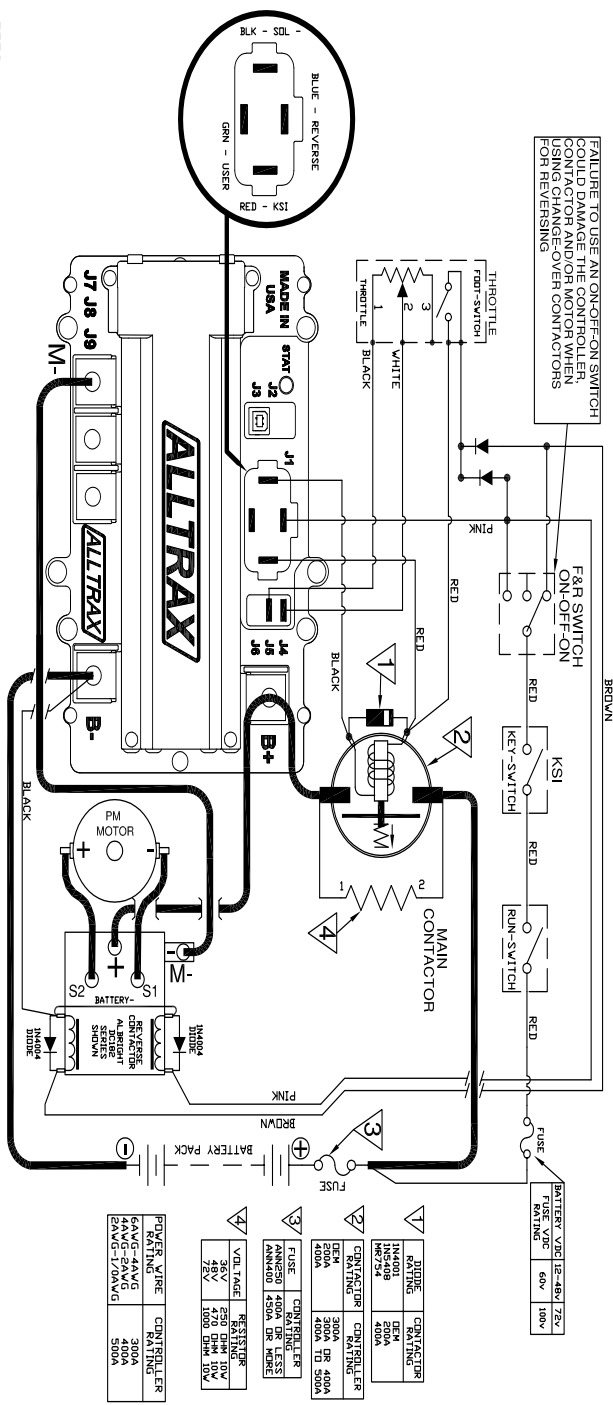
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TITLE		SR to Taylor Dunn Generic	
SIZE		Drawing Diagram	
PART NO.		DOO110-046	
REV.		B	





# Permanent Magnet

## SR - GENERIC PERMENANT MAGNET WIRING WITH REVERSE



- NOTES:
- FUSES REQUIRED FOR ALL INSTALLATIONS
  - BATTERY PACK SHOULD BE USED
  - ASSUMES FWD SWITCH IS OPEN WHEN THROTTLE DEF
  - ▶ ALTHOUGH NOTICES THE RIGHT TO CHANGE DOCUMENTATION
  - ▶ ALLTRAX MAKES NO WARRANTY AS TO THE ACCURACY, OR OTHER INFORMATION PROVIDED
  - ▶ SEE OPERATORS MANUAL FOR MORE INFORMATION

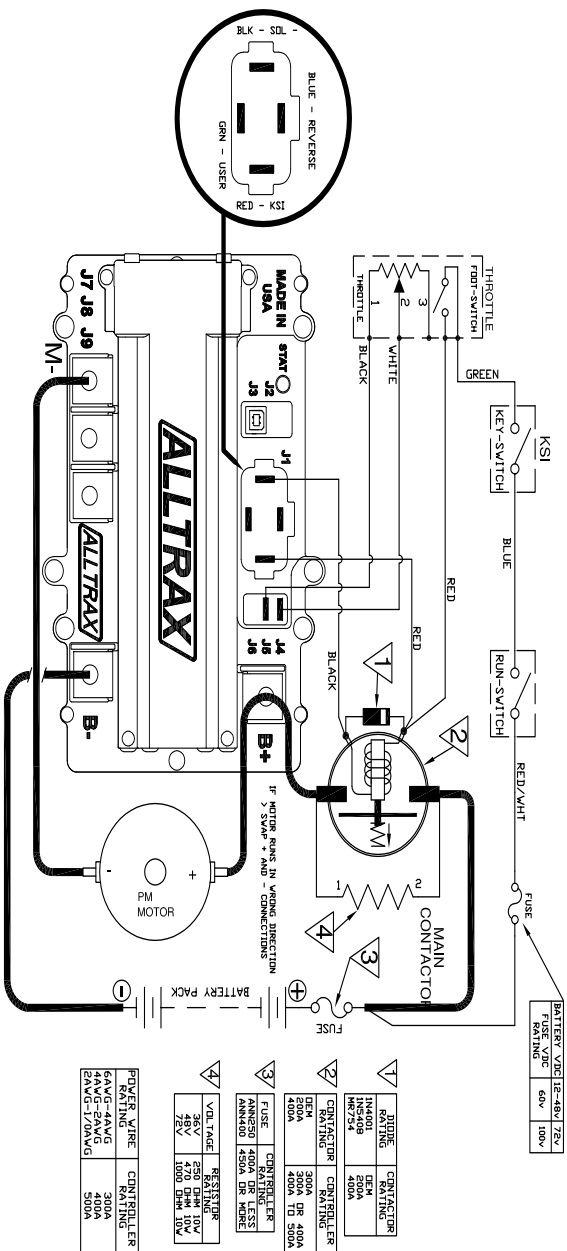
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SIZE DOCUMENT NO.	DOCI10-043
REV.	B

PART NO. DOCI10-043

# Permanent Magnet no Reverse

## SR - GENERIC WIRING PERMENANT MAGNET WITH NO REVERSE



- NOTES:
- FUSES REQUIRED FOR ALL INSTALLATIONS
  - BIRDS REQUIRED ACROSS COILS
  - ASSUMES FOOT SWITCH IS OPEN WHEN THROTTLE DEF
  - ALLTRAX MAKES NO WARRANTY AS TO THE ACCURACY, OR OTHER INFORMATION PROVIDED
  - > SEE OPERATORS MANUAL FOR MORE INFORMATION

REV.	ECO.	DATE	APPO.	DRWNG.	R. CSJKR	NO.
A	032016	032016	RC	D:\CROOKER	040116	
B	032217	032217	RC			

REVISIONS

DWG SCALE: NIS

1111 Cherry Creek Rd.  
Grove, OR 97457  
Phone: (541) 476-3566

ALLTRAX  
SR to Generic PM No Reverse  
Wiring Diagram

SIZE DOCUMENT NO. DOCT10-044

REV.	B
FILE:	D:\PWC-SR-GENERIC-PM-NO-REV-WIRE-DWG
SHEET	1 of 1

PART NO. DOCT10-044





# FAN COVER (OPTIONAL)

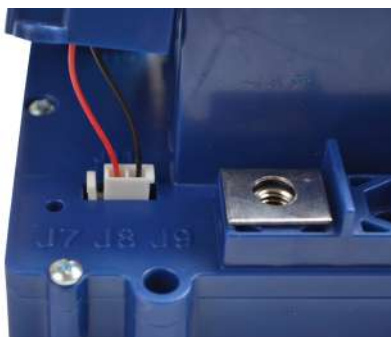
The XCT family of controllers also includes an optional Fan Cover. This cover comes standard on the 500A & 600A controllers.



## Installation:

- 1) Plug Fan Cover into controller fan port. (See picture)
- 2) Fasten cover down with the four (4) supplied screws.

Note: Make sure wires are tucked out of the way and are not being pinched by the cover.



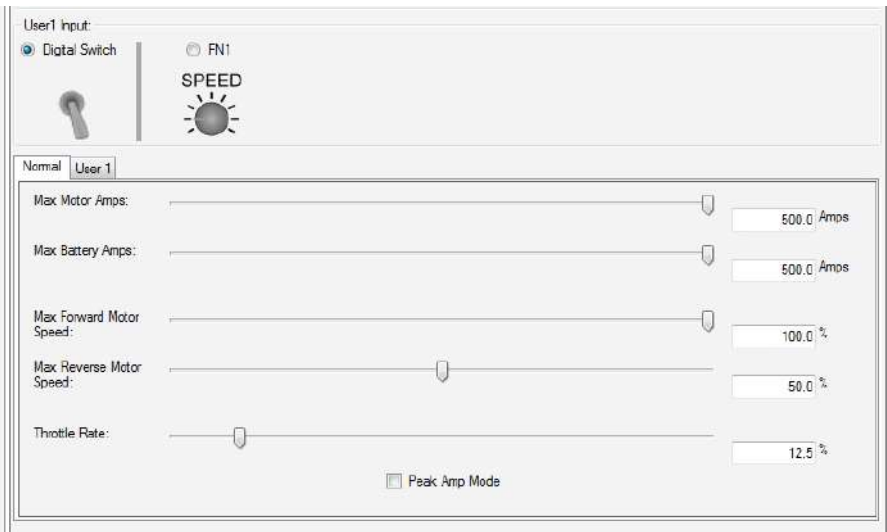
# USER (PERSONALITY) TAB

Alltrax SR controllers come equipped with a User Input tab to switch between 2 different personality profiles. The User Mode can be activated by a simple toggle switch (see drawings for wiring). User personality profile are programmed via the Alltrax Toolkit software.

Adjustable settings include:

- Max Motor Amps
- Max Battery Amps
- Max Forward Motor Speed
- Max Reverse Motor Speed
- Throttle Rate
- Peak Amp Mode

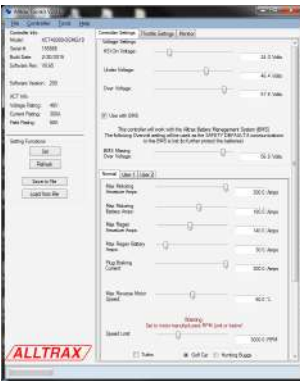
Visit our website for more information on programming the controller including the Alltrax Toolkit Manual (DOC113-002) and instructional videos.



# PROGRAMMING THE CONTROLLER

Controllers ordered for stock configurations are pre-programmed from Alltrax and it is not necessary to re-program unless the customer has specific needs. If the controller does need to be programmed it can be done via a USB A to B cable and the Alltrax Toolkit program. Visit our website for more information on programming the controller including the Alltrax Toolkit Manual (DOC113-002) and instructional videos.

Settings Screen



Controller Info Tab



The cable to is the USB-A to B. This is the most common USB printer style cable available.

Throttle Screen



Monitor Screen



# BLINK CODES

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The throttle code blinks on controller power up and alarm codes blink when the alarm happens. All alarms are self clearing so when the alarm event is over, the controller resumes normal operation, except for the Short Circuit alarm that needs a power off cycle to clear the alarm.

## Throttle codes:

1 Green LED Flash	=	0-5k throttle
2 Green LED Flash	=	5K-0 throttle
3 Green LED Flash	=	0-5V throttle
4 Green LED Flash	=	EZGO ITS throttle
5 Green LED Flash	=	0-1k Yamaha throttle
6 Green LED Flash	=	6 to 10.5 Taylor Dunn throttle
7 Green LED Flash	=	Club Car 5k-0 3 wire throttle
8 Green LED Flash	=	Reserved
9 Green LED Flash	=	Pump
10 Green LED Flash	=	USB Throttle
11 Green LED Flash	=	Absolute Throttle

## Normal Display Status:

Solid Green Light	=	Controller Ready to Run
Solid Red Light	=	Controller in programming mode
Solid Yellow Light	=	Throttle is wide open and the controller is <u>NOT</u> in Current Limit
Blinking Yellow Light	=	Throttle is wide open, but the controller is in Current Limit

## Error Codes:

SR error codes are different than the AXE/DCX alarm codes in that they will flash Green and Red, instead of just Red.

1 Green and 1 Red LED Flash	=	Short Circuit
1 Green and 2 Red LED Flash	=	Battery Under Voltage
1 Green and 3 Red LED Flash	=	Battery Over Voltage
1 Green and 4 Red LED Flash	=	M- Over temperature
1 Green and 5 Red LED Flash	=	Bus Bar Over temperature
1 Green and 6 Red LED Flash	=	Pre-charge Failure
2 Green and 1 Red LED Flash	=	Under Temp
2 Green and 2 Red LED Flash	=	Not Used
2 Green and 3 Red LED Flash	=	High Throttle Over range
2 Green and 4 Red LED Flash	=	High Throttle Under range
2 Green and 5 Red LED Flash	=	Low Throttle Over range
2 Green and 6 Red LED Flash	=	Low Throttle Under range
3 Green and 1 Red LED Flash	=	Uncalibrated throttle
3 Green and 2 Red LED Flash	=	Bad Variable Set Loaded

## **Error Code Definitions:**

- Short Circuit/Output Fault:  
Controller detected a short circuit or other fault on the output circuit. Check wiring.
- Battery Under Voltage:  
B+ Voltage lower than Low Voltage Battery Setting. Check pack voltage or program settings.
- Battery Over Voltage:  
B+ Voltage Higher than Over Voltage Battery Setting. Check pack voltage or program settings
- Over temperature:  
Busbar temperature exceeds 85°C. Let controller cool and/or add fan.
- Motor Field Failure:  
Controller detected a short in the field circuit. Check motor resistance and or replace field wires.
- Pre-charge Failure:  
B+ voltage and KSI voltage differ by more than 5v. Stuck solenoid.
- Under Temp:  
Busbar Temperature reads less than -20°C
- High Throttle Over range & High Throttle Under range:  
High Side of throttle signal is outside of acceptable window for that throttle type. Check and/or replace throttle. Change throttle type to correct throttle installed on car.
- Low Throttle Over range & Low Throttle Under range:  
Low Side of throttle signal is outside of acceptable window for that throttle type. Check and/or replace throttle. Change throttle type to correct throttle installed on car.
- Uncalibrated throttle:  
Throttle boundaries not found. In Toolkit program, select another throttle then re-select correct throttle type.
- Bad Variable Set Loaded:  
Alltrax loaded variable data is missing or corrupted. Contact Alltrax.

# WARRANTY STATEMENT

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Alltrax, Inc., (hereafter Alltrax) warrants that the product purchased is free from defects in materials or workmanship for a period of 2 years from the date of manufacture. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs, improper installation, submersion, alterations or use contrary to any instructions provided by Alltrax in verbal or written form.

In the event you should need warranty repair, contact Alltrax at (541) 476-3565 to receive warranty service authorization instructions for returning the defective product to Alltrax for evaluation. Products or parts shipped by customer to Alltrax must be sent postage paid and packaged appropriately for safe shipment. Alltrax is not responsible for customer products received without warranty service authorization and may be rejected.

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